



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
National Ocean Service  
Office of Response and Restoration  
Coastal Protection and Restoration Division  
c/o EPA Region X (ECL-117)  
1200 Sixth Avenue  
Seattle, Washington 98101

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Sean Sheldrake  
U.S. Environmental Protection Agency Region 10 (ECL 111)  
1200 6<sup>th</sup> Avenue  
Seattle, WA 98101

Dear Sean:

This letter provides **NOAA's comments on the Revised Draft Engineering Evaluation/Cost Analysis Work Plan for the Arkema Removal Action at the Portland Harbor Superfund Site, Portland, Oregon.** The document, prepared by Integral Consulting, Inc. for Arkema, is dated July 14, 2006.

As per EPA guidance pertaining to the review of this document, we have focused our comments on previously submitted NOAA comments 382, 383, and 384. In this regard, our comments are generally limited to 1) the development of geo-statistical methods for identifying data gaps to identify the extent of DDx in sediment at or associated with the Arkema site and 2) methods to accurately assess the extent of sediment bioturbation at the site.

#### **GENERAL COMMENTS:**

NOAA recognizes and appreciates that the Arkema response to NOAA-submitted comments 382-384 includes some of the additional core samples we requested to better quantify the mass of contaminants, particularly DDx, in the river sediments. We believe that the quantification and mapping of the distribution and mass of contaminants found in the sediments, with sufficient detail to support removal and/or capping decisions, is vital to the success of this removal action. To reduce uncertainties, development of such maps should utilize a geo-statistical method, such as kriging. NOAA requests that a geo-statistical method be applied for this purpose and offers to work with EPA and its partners in the selection and application of the selected method, as appropriate or warranted.

In our review of the July 28, 2006 revised work plan, we noted that there are six core samples shown on Figure 3-2 (WR-VC-62, 64, 66, 68, 70, and 72) located in the navigational shipping channel that were collected from May 6 to May 25, 2005 (possibly by the Corps of Engineers) that were not reported in the September 26, 2005 draft work plan. These samples also partially satisfied our request for additional core samples. They show that high levels of DDx contamination (as shown in Appendix C, Table C-2d, page 23) extend out from the site



into the shipping channel, mostly in the top foot of sediments. NOAA advises that additional core samples be added further out from those that are contaminated above selected screening levels. The location and density of these samples should be dictated by the requirements of the selected geo-statistical mapping method, with the understanding that the resulting mapped extent and mass of the contamination will be based on a conservative statistical prediction. **The more sediment samples there are, the more limited and accurate this prediction will be.** The samples found in the shipping channel must be included in the statistical mapping effort because those results will help to establish the contaminant distribution probability function. As EPA, and presumably Arkema, are aware, given the high cost of mobilizing for additional sediment sampling events, it is generally prudent to consider collecting more samples during the next event than may be absolutely necessary, rather than fewer.

### **SPECIFIC COMMENTS:**

Section 8.2.1.1 Sediment Quality Characteristics, Page 8-22, Second Paragraph. The last sentence in this paragraph states that sediment borings will be examined for bioturbation as they are logged. Based on our field experience, NOAA believes that visible examination of the sediment will be of little value. Hence, we recommend that Beryllium-7 (Be-7) be measured in the shallow sediments as an indicator of bioturbation.

Be-7 is formed in the atmosphere from the interaction of nitrogen and oxygen under bombardment with cosmic rays. Be-7 is a solid, which adheres to aerosols and particulate matter or dissolves in rain which is then deposited on the earth's surface via precipitation or dry fallout (USGS 1998). With a half-life of 53 days and measurable time span of only about 1 year, it is useful only to identify recently deposited material. It is sometimes used to calibrate other dating methods or to identify areas of rapid sediment deposition or high levels of bioturbation. If the sediments contain no measurable Be-7, it suggests that no sediments have been deposited at that site recently, or that a recent occurrence of a process such as erosion has removed a sediment layer of unknown thickness from the surface. This is vital, since other methods such as Pb-210, can only generate a meaningful sedimentation rate by knowing the age of the sediments at the very top, which are usually assumed to have been deposited continually until the collection of the sample.

These Be-7 measurements should be conducted immediately after the sediment traps proposed in Section 8.1.9, Page 8-17 are deployed and collected so sedimentation rates can be identified and used to interpret Be-7 distribution in the sediment. Measurements of Be-7 should be collected from the top 1 foot of sediment at least, and deeper if sediment traps indicate that a sedimentation event of greater than 6 inches per year has occurred.

Be-7 analysis is performed locally by the US Department of Energy, Pacific Northwest National Laboratory (PNNL) in Sequim, WA:

[http://marine.pnl.gov/research\\_areas/marine\\_chem.pdf](http://marine.pnl.gov/research_areas/marine_chem.pdf)

PNNL recommends using the Gregory Undisturbed Sampler or the Osterberg Sampler for collecting a core for Be-7 analysis. Cores should be collected with a minimum of disturbance. PNNL also recommends using one cm sections for better resolution of the mixed layer or recent sediment deposition zone. We are happy to work with EPA to further explore the application this method and assist with coordination. The contact person for Be-7 analysis at PNNL is as follows:

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NOAA appreciates the opportunity to provide these comments. Please let me know if you have any questions.

Sincerely,

Robert Neely  
NOAA Coastal Resource Coordinator

cc: Alyce Fritz, NOAA / NOS / CPRD (by email)  
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References:

United States Geological Survey (USGS). 1998. *Short Lived Isotopic Chronometers –A means of Measuring Decadal Sedimentary Dynamics*. Fact Sheet FS-073-98.